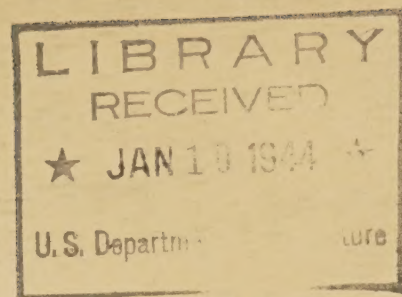


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RIBES ERADICATION MANUAL

For use in the

INLAND EMPIRE

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U.S. VVV  
Division of Plant Disease Control  
Bureau of Entomology and Plant Quarantine  
618 Realty Building  
Spokane, Washington  
April 16, 1935.

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# BLISTER RUST CONTROL - INLAND EMPIRE RIBES ERADICATION MANUAL

## INTRODUCTION

### WHITE PINE BLISTER RUST

White pine blister rust is a fungous disease which kills the white or five-needled pines. The important five-needled pines in the United States are western white pine (Pinus monticola), sugar pine (P. lambertiana), eastern white pine (P. strobus), white bark pine (P. albicaulis) and limber pine (P. flexilis). The first three are commercially important; in the Inland Empire we are concerned with protecting only the western white pine.

The disease cannot spread directly from pine to pine; it must go through a stage of development on currant or gooseberry bushes, known in control work by the generic term, Ribes. The four important species of Ribes found in the Inland Empire are Ribes petiolare (wild black currant), Ribes inerme (white-stemmed gooseberry), Ribes viscosissimum (sticky currant) and Ribes lacustre (prickly currant). Other species found occasionally in certain localities are Ribes irriguum (inland black gooseberry), Ribes acerifolium (maple leaf currant), Ribes triste (wild red currant) and Ribes americanum.

There are four stages in the life-cycle of white pine blister rust, namely, mycelial, aecial, uredinial and telial. The first two stages are on the white pine and the last two on Ribes. Control of white pine blister rust is based on two weaknesses in the life-cycle of the disease: First, aeciospores produced by fruiting cankers on white pines cannot infect other pines; second, the pine-infecting sporidia produced during the telial stage on Ribes can spread only a short distance from Ribes to pine. This being true, any stand of white pine can be protected by the eradication of the Ribes from within the stand and for a short distance around it.

Additional information concerning these facts is given in supplementary bulletins supplied to each camp. A study of these bulletins will show that the destruction of Ribes is constructive work for the protection of the valuable white pine stands of the Inland Empire.

### PURPOSE OF MANUAL

The purpose of this manual is to bring together all important facts relative to the eradication of Ribes to serve as an aid and guide for persons who are to supervise Ribes eradication work.

Any deviation from the instructions issued in the manual will be made in written form. These revised instructions must be placed in this manual.



## ORGANIZATION AND PERSONNEL

It is incumbent on all members of the blister rust control operation to abide by all Forest Service regulations concerning personal conduct in the woods. These regulations include restrictions on smoking in the woods, speed regulations on roads, and any other regulations issued for the benefit of the general public. Men must not blaze or otherwise scar trees or in building camp must not cut white pine for tent poles.

General Supervision. Ribes eradication for the control of white pine blister rust is a joint undertaking by the Division of Plant Disease Control, the Forest Service, and the States and private agencies concerned. Under this cooperative arrangement, the Division of Plant Disease Control and the Forest Service each assign one man to direct the work on each forest. In practice, the Forest Service representative assumes direct responsibility for transportation, equipment and supplies. The responsibility for the general supervision of the technical phases of the field work is assumed by an operation supervisor aided by an assistant operation supervisor both from the Division of Plant Disease Control. This Division also places a man on each forest project in the capacity of checking supervisor to direct the checking of the efficiency of the work.

Unit Supervisor. A unit supervisor is responsible to the operation supervisor and the assistant operation supervisor for the general supervision of a specified group of camps. In these camps, he is responsible for the proper training of men, the application of the most practical and economical methods of eradicating Ribes, the complete adherence to instructions and regulations included in the Ribes Eradication Manual, and the execution of special instructions given him by his immediate supervisor. In performing his duties, it is necessary that he make periodical inspections in each camp, spending at least a day and a night with each camp for each inspection and any additional time necessary to accomplish desired results. He must submit necessary reports showing the progress of the work on his unit.

Camp Superintendent or Camp Boss. A camp superintendent or camp boss is responsible to his unit supervisor for the proper conduct of Ribes eradication work in his camp, and for submitting necessary reports showing the progress of the work in his camp. With the assistance of his foremen or crew leaders, he must train his men, apply the most practical and economical methods of eradicating Ribes, follow the instructions and regulations included in the Ribes Eradication Manual, and carry out any special instructions given him by his unit supervisor. To do this, he must spend the greater portion of his time in the field supervising and directing his men.

A camp superintendent in addition to his field duties must establish and maintain such cooperative agreements with the Army personnel as are necessary for the coordination of the field work and the camp organization. He must abide by the regulations set up in the "Handbook for Emergency Conservation Work."

A camp boss in addition to his field duties must fulfill the necessary duties incident to the establishing and supplying of his camp, and the keeping of payrolls and meal records.



Foreman (E.C.W.) A foreman is responsible to his camp superintendent and must submit to him daily reports of the progress of his crew. He must train the men assigned to him, apply the most economical and practical methods of eradicating Ribes, follow instructions and regulations included in the Ribes Eradication Manual, and carry out any special instructions given him by his camp superintendent. He must closely supervise the work of his crew to obtain the greatest output and highest efficiency of work possible.

Crew leader. A crew leader is responsible to his camp boss or foreman. He is responsible for the proper conduct of his men in the field, for the proper performance of work according to the prescribed methods included in the Ribes Eradication Manual, and for an efficient and satisfactory output of work by his men and himself. He submits a daily report of his work to the camp boss or foreman.

Crew man. A crew man is responsible to his crew leader. He must perform his work according to the most practical and economical methods as prescribed in the Ribes Eradication Manual. He is responsible for the finding and complete eradication of Ribes on his strip. He makes a report to his crew leader as to the number of Ribes by species which he pulls.

## ORGANIZING AND PLANNING WORK

### DIVISION OF AREA

Several divisions of area are used in organizing and planning work.

Forest Projects. A forest project consists of a national forest and any adjacent private and state lands that can be effectively administered with the national forest unit.

Working Units. Working units comprise major divisions of a forest project and are designated by number. They are set up as permanent units for planning blister rust control work and keeping Ribes eradication records.

Townships. Townships are divisions of territory based on a land survey. As all maps for permanent files showing Ribes eradication data are made on a township basis, township lines must be followed in laying out areas. All field data must be recorded on the map within each township.

Camp Areas. Camp areas represent assignments of territory to be worked by particular camps.

Blocks. Blocks are divisions of a camp area, used at the discretion of the operation supervisor of a forest project for the purpose of directing and estimating progress.

Crew Divisions. Crew divisions are divisions of a camp area laid out by the camp boss for the purpose of organizing the field work and assigning areas to crews. These are the smallest units for which eradication data are compiled



and recorded on the map. Data must be recorded on the basis of crew divisions because aggregate totals for the whole camp area are meaningless in view of future work plans.

## WORK PLANS

Effective administration of work demands careful preparation of work plans.

Work plan for the forest. To be made by operation supervisors. Based on pre-eradication surveys, this plan will cover the entire blister rust control work on the forest. It will include the actual or tentative location of all camps, with tentative boundaries established for the area to be worked by each camp, and the order in which various parts of this area will be worked. In addition, camps will be grouped into units, each to be supervised by a unit supervisor.

Work plan for a unit of camps. To be made by unit supervisor with approval by operation supervisor. Such details in the plan prepared by the operation supervisor that cannot be determined definitely are to be completed by the unit supervisor from his actual knowledge of the conditions on the ground. Such details as exact location of camps and the boundaries of areas to be worked by the various camps within the unit are the unit supervisor's responsibility. During the course of the season, he must coordinate the work between camps, in order that all area may be completed in a solid block at the close of the season. The coordination of the work between camps, also necessitates the planning of camp moves to other areas. All this is essential in providing for the orderly and progressive completion of areas, in avoiding unnecessary camp moves, and in providing facilities for moving camps with a minimum of delay or confusion.

Work plan for a camp. To be made by camp boss or camp superintendent with the approval of and any necessary assistance from the unit supervisor. There must be a definite understanding of camp area boundaries between adjoining camps.

The most effective administration of the work demands that the man in charge of a blister rust control camp have his attack planned in advance of actual crew work. To plan this attack, it is necessary that both the man in charge of the camp and the unit supervisor have an intimate knowledge of eradication types, Ribes concentrations, and the general working conditions within his camp area. This information is of great importance in laying out the work for individual crews.

This plan should include the definite boundaries of the camp area, the order in which various parts of the camp area will be worked, tentative estimates on amount of work necessary on all parts, and the laying out of crew divisions in advance of the crews.

In order to make a satisfactory work plan, it is necessary to make an advance survey of the area. This survey should be made by sections in the order in which they will be worked by crews. The number of strips which will be run through a section will be determined by the conditions encountered and the requirements for adequate information. The strips will be a maximum of 20 chains apart and a minimum of five chains. The strips will be run five chains apart on those areas which are practically Ribes-free and which may be eliminated from crew work.



Procedure for advance survey. The procedure is identical with the system of advance checking.

Width of strip - 30 feet.

Run strip in cardinal directions and tag beginning and end of strip.

Locate beginning and end of strip in relation to some section corner or definite land mark. Subsequent strips can be located with reference to strips previously tied in with definite land marks.

Travel along compass line recording each pace on tally machine.

Record following information as found along strip:

Eradication type.

Where eradication type changed.

Where streams, roads, trails crossed strip and direction of each.

Ribes data for each five chains along the strip.

Show number of bushes over feet of live stem; e.g.  $\frac{3}{75}$ , 3 bushes and total of 75 feet of live stem. When Ribes are too numerous to count or estimate live stem, note in five-chain transect the Ribes conditions as L. (light), M. (medium), H. (heavy).

Any other important points should be noted as need for foot trails, proper direction for working area, and size of crew divisions.

All strips are to be plotted on a map showing eradication types, Ribes data, streams, roads and trails to serve as a base map on which to plan the work of the camp.

It is planned that this survey will be made as a joint undertaking between the camp boss and the checker. At the start of the season, when the camp boss is busy training crews, the checkers will start this survey. They will continue doing this until it is necessary for them to start checking area that has been worked. At that time, the camp boss will be free to complete the survey on his area. In order that a camp boss may know the conditions on his area, it is essential that he do as much of this work as possible. During the course of the season, the checkers will also assist in this work when they are not engaged in checking worked area.

The cooperation between the camp boss and checker is also important in coming to an agreement as to the classification and boundaries of eradication types prior to the working of the area by the eradication crews.

This survey must be made in advance of the crew work in all cases, and should be completed as early in the season as possible.

Laying out crew divisions. This represents the first step in the execution of the work plan for a camp. Since it is on the basis of these divisions that a camp area will be worked, crew divisions are important for the orderly and progressive completion of the area and for the keeping of detailed eradication data.

Size of crew divisions. These divisions should represent about a week's work for a crew, or an area of 40 to 80 acres. Points to be considered are:

The work of all crews should be concentrated on an area which will make it possible for a camp supervisor to contact most of his men in one day. On the other hand crews must not be worked so close together that they will interfere with each other. Crews should have a definite assignment and should not be shifted around from day to day.

The worked area in a camp must be in a solid block at the close of the season. During the course of the season, the worked area must be kept contiguous and in a compact unit to permit systematic checking and to avoid leaving unworked patches throughout the area for any length of time.

Method of laying out crew divisions. In most cases it will be necessary to lay out crew divisions by using a string-line boundary. A satisfactory system is to lay out these divisions by running a compass line from a main stream to the top of a main ridge. Any natural boundaries, roads or trails may be used. In all cases township lines and working unit boundaries will be used as crew division boundaries. Never have a crew division cross a township line or working unit boundary. Wherever practicable use section lines as boundaries. It must be borne in mind that the lay of the ground is the principal factor determining the method of laying out crew divisions. The points described are to be used as guides.

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All men in a supervisory capacity are responsible for the complete working of areas falling under their supervision. Close inspection must be made to avoid missing areas between units and camps, and between crew divisions within a camp area.

### ERADICATION TYPES

An eradication type is a forest condition determined by the age and density of the timber stand and the amount of brush cover. Eradication types have a direct relation to the amount and distribution of Ribes, and consequently call for special consideration in applying control measures. Types will determine the method of working, the width of crew strip, live stem standard, and in the planning of future control work, the time for reworking and the number of reworkings.

It is important therefore to make accurate type maps and to record eradication data by types.

Pictures illustrating type characteristics are included in this manual. Some difficulty may be encountered in classifying types when these characteristics are not as prominent as shown in the illustrations. The principal factors determining an eradication type are timber size, density and ground cover.

Timber size is based on tree diameter at breast height (D.B.H.). This provides the classifications of reproduction, pole and mature.



Density and ground cover can only be classed in relative terms, namely, open and dense. In the open stands, the trees are scattered or in individual clumps, resulting in an open canopy. An open canopy is favorable to the growth of brush and Ribes. In those open stands where the coniferous growth is just starting conditions are very favorable to the introduction of numerous Ribes bushes. This open condition of a stand, if it continues through the pole and mature stages, will permit the continued growth of Ribes and brush which established themselves when the stand was young. No new bushes will appear during the pole and mature stages except where some mechanical disturbance of the duff causes the germination of Ribes seeds.

In the dense stands, the trees occur in a uniform densely populated stand providing a closed canopy over the ground. The density of the stand is so heavy as to hinder the growth of Ribes and brush. The forest floor is practically free of green vegetation. No new Ribes bushes appear in the dense stands and those old bushes which established themselves prior to the closing of the timber canopy are being suppressed. The process of suppression is gradual starting during the advanced reproduction stage when the canopy begins to close. When the stand reaches the dense pole stage, practically all Ribes and brush have died. Any Ribes bushes surviving in a dense stand will have long trailing stems and few light colored leaves. The majority of the Ribes and brush found in dense stands occur in the occasional openings, a condition which is not properly a part of the type. When these openings in the dense stands are so frequent as to alter the uniform density, the stand should be classed as open. Dense stands require very little work.

Other types in which timber size and density are not the determining factors are more readily recognized, namely, stream, subalpine, cut-over, burn, and brush types.

Large areas are seldom found where timber and other ground cover are uniform. There will be occasional patches which do not conform with the rest of the type. These should be classed the same as the surrounding area. Forty acres will be the smallest unit of area to be typed separately, except in the case of smaller areas which require a large amount of work.

A careful consideration of the description of the factors determining types, along with a careful study of the pictures will aid the supervisory personnel considerably in classifying areas according to eradication type.

Open Reproduction. Trees under four inches D.B.H. predominate. Trees are scattered or in individual groups. The openness of the stand is favorable to the introduction and persistence of Ribes and brush. The Ribes population is increasing upon these areas.

Dense Reproduction. Trees under four inches D.B.H. predominate. Trees occur in a uniform densely populated stand. The density of the stand is so heavy as to hinder the growth of Ribes and brush. No new bushes are appearing and the old bushes which established themselves prior to the closing of the timber canopy are gradually being suppressed. The suppressed bushes have long stems and few leaves. Any great amounts of Ribes and brush are confined to the occasional openings in the dense stand.

Open Pole. Trees four inches to twelve inches D.B.H. predominate. Trees are scattered or in individual groups. The openness of the stand permits the continued growth of Ribes and brush. The Ribes population, as a general rule, has reached an equilibrium, meaning that Ribes species have established themselves as a component part of the stand and are able to maintain themselves in this condition due to the general openness of the timber stand, showing relatively little tendency to either increase or decrease in number.

Dense Pole. Trees four inches to twelve inches D.B.H. predominate. Trees occur in a uniform densely populated stand. The density of the stand is so heavy as to hinder the growth of Ribes and brush. No new bushes are appearing and many of the old bushes which establish themselves prior to the closing of the timber canopy have died. Those bushes still surviving are gradually being suppressed, having long stems and few leaves. The majority of the Ribes and brush occur in the occasional openings in the dense stand, a condition which is properly a part of the type.

Open Mature. Trees over twelve inches D.B.H. predominate. Trees are scattered or in individual groups. The openness of the stand permits the continued growth of Ribes and brush. The Ribes population has reached an equilibrium, meaning that Ribes species having established themselves are able to maintain themselves in this condition due to the general openness of the stand, showing relatively little tendency to either increase or decrease in number.

Dense Mature. Trees over twelve inches D.B.H. predominate. The density of the stand is so heavy as to hinder the growth of Ribes and brush. No new bushes are appearing and most of the old bushes which established themselves prior to the closing of the canopy have died. The few bushes surviving are in a suppressed condition and have maintained themselves due to favorable location. Brush and Ribes are likely to occur in any openings in the dense stand.

Cut Over. An area from which all or a large proportion of the timber has been recently cut. Such an area will be classed as cut-over until new trees have appeared to change the condition. This type is characterized by many duff disturbances, brush piles, spot burns, and skid trails. Conditions are very favorable to the reproduction and continued growth of Ribes.

Brush. An area supporting few or no trees, which is covered with a heavy growth of brush. Conditions are favorable for Ribes growth.

Burn. A burned area on which no new trees have appeared, and which is also relatively free from brush. Conditions following a single burn are very favorable to Ribes reproduction and continued growth. Double burns are relatively free from Ribes.

Sibulpine. This type occurs at higher elevations and at the heads of many streams. It is marked by heavy brush growth, slow tree growth, numerous rock exposures or talus slopes, and very difficult working conditions.





W-1246 Open Reproduction (OR)

1. Timber size. A timber stand in which trees under 4" D.B.H. predominate and trees are scattered, or in individual groups.
2. Ground cover. Generally brush and many Ribes are present.



W-1522 Dense Reproduction (DR)

1. Timber size. A timber stand in which trees under 4" D.B.H. predominate and the trees occur in a uniform, densely populated stand.
2. Ground cover. Brush and Ribes may be present but are suppressed and generally have long stems and few leaves.







W-1518 Open Pole (OP)

1. Timber size. Timber stand in which trees 4" to 12" D.B.H. predominate and the trees are scattered or in individual groups.
2. Ground cover. Generally brush and Ribes are present.



W-1106. Dense Pole (DP):

1. Timber size. A timber stand in which trees 4" to 12" D.B.H. predominate and are uniformly distributed over the area.
2. Ground cover. Practically no brush or Ribes are present on the forest floor.









W-942. Open Mature (OM):

1. Timber size. A timber stand in which trees over 12" D.B.H. predominate and the trees are scattered or in individual groups.
2. Ground cover. Brush and Ribes are usually present on the forest floor.



W-964. Dense Mature (DM):

1. Timber size. A timber stand in which trees over 12" D.B.H. predominate and the trees are uniformly distributed over the area.
2. Ground cover. No brush or Ribes are present on the forest floor.









W-1122. Stream Type:

Stream type, represented by moist conditions bordering streams, is characterized by the presence of considerable brushy and herbaceous growth which usually contains large numbers of Ribes. When these conditions extend away from the immediate edge of the stream and require separate working from the hillside type, the area is to be classified as stream type. When this is the case, the boundary between stream and upland types is marked by the break between the stream flat and the slope.



W-1128. Cut-over (CO):

1. Timber. A cut-over area is represented by a stand in which all or a portion of the merchantable timber has been cut.
2. Ground cover. Brush and Ribes are generally present, the number depending on the system of cutting. There may be some reproduction present but this is too small to influence the working conditions.









W-1281A Burn

An area recently burned on which no reproduction has yet appeared, or one burned so many times as to leave it barren. Ground cover consists chiefly of Ribes and herbaceous growth. In the case of a recent burn the Ribes population will be on the increase. In the case of re-burns, the Ribes which may have survived will have reached their maximum development.



W-965. Alpine Type:

Alpine type which is typical of the country at the heads of many streams is marked by ~~rocky~~ <sup>rock</sup> ~~growth~~ <sup>tree</sup> growth, numerous rock crops or talus slopes, and unusually hard working conditions.





Stream type. Stream type represents the area bordering streams, characterized by moist conditions and considerable brush and herbaceous growth which generally contain numerous Ribes. When these conditions extend away from the immediate edge of the stream and require separate working from the hillside type, the area is classified as stream type. The boundary between stream and upland type is generally marked by the break between the stream flat and the slope.

## ERADICATION METHODS

Five methods have been developed for the practical and economical eradication of Ribes. These methods are adapted to meet various working conditions. Careful judgment must be used in the application of these methods and variations in each method in order to perform the work most efficiently and economically under different working conditions.

### HAND ERADICATION

#### Crew size and formation.

Three-man crew with all men working in line.

In ECW camps, it may be necessary to use larger crews where it is not possible to supervise a large number of small crews. The number of competent crew leaders available will determine the number of crew men to be used in a crew.

The men in the crew work nearly abreast, with each man maintaining his proper interval and slightly behind the man on whom he is guiding. The guide man follows at a proper distance the last string line laid. The crew leader generally works in the center of the line where he can observe the work of both his men. The third man on the outside lays the next string line and covers the ground over to his neighbor. The line is his outside boundary but he must pull all Ribes which are under or just outside the string line. In all crew work it is essential that each man glance over the area covered by his neighbors as the crew moves along. This serves to find some Ribes which would otherwise be left. When heavy Ribes concentrations are found, all men must help to take them out, each man assisting his neighbor whenever possible.

The crew formation as described and the cooperation between members of the crew are necessary; the former promotes higher efficiency and the maintenance of a proper width of strip, and the latter speeds up the progress of the crew.

#### Width of strip taken by a crew.

Factors affecting width of strip. The determining factors are the number of Ribes and ground cover. The effect of ground cover on visibility is the most

important condition influencing the width of strip. Any variations within the limits set down below are to be governed by visibility factors as influenced by Ribes and brush conditions.

Minimum for any area is 12 feet per man.

Maximum for any area is 60 feet per man.

When men are working in wide formation they should look for Ribes sites, openings in the stand and wherever ground cover is present. Ribes may be found on these sites within an area that is otherwise free of Ribes.

#### Laying out crew strips.

Laying strips as the crew works. This is the accepted procedure in all types of working conditions.

Laying strips in advance of crew. This system may have merit from the standpoint of greater crew production on heavy Ribes areas since one man can lay out string lines in advance for four or five crews. This method should be used only when approved by the unit supervisor.

#### Direction of work.

Uphill work. This is the most efficient method from the standpoint of costs and eradication efficiency.

Downhill work. This is less satisfactory and rates second to uphill work. Searching is more difficult than in uphill work and men must look behind them for Ribes that may have been hidden by brush when viewed from above.

Contour work. This is the most costly method.

On account of the irregularity of topography, crews may find it necessary to work uphill, downhill and on contour in the course of a single strip. Also at the heads of drainages at a considerable distance from camp, it may be necessary for crews to work areas on contour to eliminate an excessive amount of travel time between the area and camp. However, in the absence of these special problems, the general plan of work should be laid out to get a maximum of uphill work and a minimum of contour work for the crews.

#### Rework.

Each crew strip where medium or heavy concentrations of Ribes were found by the regular crews must be reworked by a fast and capable man. He reworks these strips three or four days after the original crew work, when the pulled Ribes have dried and will not interfere with his searching. The responsibility lies with him to get any Ribes missed by the crew and leave the area conforming to the live stem standard. He should rework in one day the area covered in four or five crew days. This rework must be done before the area is turned over for final checking. The fact that these strips are reworked does not relieve the crew of the responsibility of doing an efficient job on the first time over the ground.



## How to pull and dispose of Ribes.

A great deal of care must be taken in the actual pulling of Ribes bushes. They should be pulled by taking a firm hold at the base of the bush and uprooted by a steady pull or a series of careful jerks which will not break the bush off at the crown. In pulling bushes, men must be careful to place themselves in proper position to get the maximum pull, and at the same time to prevent themselves from straining their backs or muscles. Tools are furnished to assist in digging up bushes that cannot be pulled by hand and each crew must carry one or more of these tools (trench picks or Pulaskis) for this purpose. It is often possible, with a few strokes of the tool to loosen the roots of the bush sufficiently to make it easily pulled by hand. Tools can be used to hasten the eradication of many bushes that are ordinarily pulled by hand. (As an auxiliary method for the eradication of large bushes, see the method of decapitation and treatment with chemical.)

The worker must pull Ribes as he moves ahead. This is the only way to avoid trampling unpulled bushes into the ground and breaking off stems.

Pulled Ribes must be piled behind the worker, away from unpulled Ribes. Do not throw them over the last string line or on area that has not been covered. Leave no bushes or fragments of live stem on the ground; place them on stumps, logs, or hang them on other brush. When the Ribes bush is broken from the crown, the crown must be dug up and placed on top of the bush in order to aid in checking.

## Ribes sites.

The following represents a list of important Ribes sites and the percent of the missed Ribes occurring on each site. This information should be called to the attention of the men as a helpful means of improving eradication efficiency.

<u>*Site of Missed Ribes</u>	<u>Percent of Total Missed Ribes</u>
General distribution	49
Moist or damp spots	13
Decayed stumps or logs	11
Windfalls and down logs	11
Upturns	8
Rock outcrops	8

\*Where there has been a disturbance in the forest floor as in the case of roads, trails, skid trails, and small burns, Ribes are likely to occur in great numbers.

## Causes of inefficient work.

The following points require considerable attention on the part of the supervisor in order to prevent poor work:

Ribes not completely pulled out.

Careless pulling or jerking of Ribes.

Careless disposal of pulled Ribes.

Trampling bushes under foot.

Failure to use tool when necessary.

Failure to work systematically through a patch of Ribes.  
Failure to make final check-up where heavy Ribes concentrations were pulled.  
Failure of man to complete the job when helping his neighbor.  
Needless conversation between members of the crew.  
Failure to concentrate on task of finding Ribes.

### CHEMICAL ERADICATION

This method is used on R. petiolare only. It should not be used on R. inerme or R. lacustre without definite instructions from the operation supervisor.

#### Crew organization

One crew leader  
Two to four crewmen

#### Equipment

Knapsack spray outfit for each crewman  
Two tubs for every four crewmen  
Two buckets for every four crewmen  
One spring balance  
One funnel  
One-1-gal. measure  
One-1-gal. can for glue  
One yard cheesecloth for straining chemical

#### Mixing chemical solution

10 gallons water  
One-half pint stock solution of glue (see formula below\*)  
10 pounds Atlacide

This batch of chemical is prepared by pouring four or five gallons of water into the mixing tub, adding and mixing the one-half pint of glue, adding the ten pounds of Atlacide and stirring until part of the chemical is dissolved, then adding the rest of the ten gallons of water and mixing the solution until all chemical is dissolved.

\*The stock solution of glue is prepared in advance in camp as follows: Soak one-half pound flaked glue overnight in about one gallon of cold water. On the following morning heat this solution over a slow fire and stir until completely dissolved. Then add enough water to make three gallons and mix thoroughly after cooling; this stock solution of glue is then ready for use in the field. Each chemical crew carries its own supply. Glue used in the chemical solution causes it to spread uniformly on the leaves and also gives the solution cohesiveness causing it to stick to the leaves.



RIGHT AND WRONG METHODS OF PULLING RIBBON BUSHES



Right Method



Result. Roots pulled with bush.



Wrong Method



Result. Bush broken off at the crown.





### Laying out the work. (Generally done by crew leader)

Strips, 12 to 15 feet in width, are laid off with string lines. In most cases these strips should run crosswise to the stream, although in narrow stream type it may be advisable to run them parallel to the stream.

Filling stations are established along the stream where batches of chemical are mixed and where men fill their spray tanks. These stations must be placed in a moist site or on a sand or gravel bar free from debris and should be conveniently located for use by two or more crewmen.

### Method of crew work

Each crewman is assigned to a block of strips. When he empties his tank of chemical solution he marks the place where he sprayed last, refills his tank at the filling station, and begins to spray again where he left off. When he completes his set of strips, the crew leader assigns him another set. The crewman keeps a record of the number of gallons of solution which he uses and reports same to his crew leader.

In applying chemical solution a dosage must be applied to the crown of the bush. In addition the leaves and stems must be thoroughly covered.

### Hazards involved in using Atlacide.

Atlacide is highly inflammable when mixed with organic matter such as duff and wearing apparel in a dry condition. Some men may handle this dangerous chemical through ignorance or negligence in a manner completely contrary to regulations and common sense. They may go unharmed for months or years, but sooner or later they are apt to suffer severe injury. The regulations as set forth below must be followed. When these regulations are followed, this chemical can be handled and used with complete safety.

### Regulations for men mixing and applying chemical.

1. Keep kegs closed when not removing chemical.
2. Sweep up spilled chemical and throw into running water. Do not return dirty chemical to containers.
3. Locate filling stations, if possible, on sand or gravel bars near stream, otherwise soak the ground for several feet around the station at frequent intervals. Make a careful clean-up before leaving a station.
4. Patrol sprayed areas during hot, dry weather for three days following spraying.
5. Avoid spilling solution while mixing or filling tanks.
6. Rubbing vaseline into hands before and after work will help to prevent irritation from the chemical.
7. Do not leave chemical solution in tubs when animals are around. Never leave a tub of chemical solution exposed over night. The salt in the chemical attracts animals.
8. Rules regarding clothing:
  - Grease boots thoroughly and frequently to prevent the absorption of the chemical.
  - Bottoms of trousers must not have cuffs or frayed edges.

Spraying clothes must not be allowed to dry completely. Clothing worn while handling chemical solutions must be left on the job and other apparel worn between camp and work. Never hang clothes used on spraying work near a fire or stove to dry. They are sure to ignite as soon as they dry out. Wash clothes thoroughly at least once a week. Remember that clothes once saturated with chemical are never entirely safe to wear again when completely dry. Wear no chemical clothes if called out to fight fire. This includes everything from hat to shoes. Do not smoke or carry matches while wearing chemical clothes.

Remember at all times that the chemical or clothing saturated with chemical is as dangerous as high explosives and the rules and regulations listed above must be strictly followed to avoid accident.

### Rules for Handling and Transporting Chemical

1. Prohibit smoking where chemical is handled or stored.
2. Do not store chemical in the open unless 200 feet from buildings and on ground free from dry grass, debris or organic material.
3. Keep floors of trucks used in transporting chemical free from oil, grease and forest litter. Always sweep up chemical leaking out of broken cans, and throw sweepings into running water or bury in mineral soil.
4. Avoid needless bumping or dropping of kegs.
5. Tie loads securely either on trucks or pack animals to prevent jostling and friction.
6. Equip trucks when transporting chemical with Pyrene fire extinguishers.
7. Do not move damaged kegs into the field. Transfer chemical to a good container.
8. Do not transport chemical solution in truck no matter what container is used.

### SLASHING METHODS

#### Areas worked by this method.

This method involves high costs and therefore has a restricted use. It is only employed as an auxiliary method to clear the ground of brush where it is impossible to get the Ribes roots by ordinary hand pulling methods. No slashing will be done without permission of the unit supervisor.

This work is entirely confined to stream type, especially swampy or semi-swampy areas, where numerous Ribes occur in dense tangles of brush. On these areas, where Ribes occur in scattered concentrations, slash only those spots where the Ribes are present. A foreman or camp boss must watch this matter closely to avoid unnecessary slashing.



## Size and organization of crew.

Two-man crew.

Each man slashing and piling brush, and pulling Ribes as he finds them.  
Use as many two-man crews as necessary, assigning each crew to a block.

## Tools.

Pulaskis and axes for cutting heavy brush.

Brush hooks and scythes for small brush.

Grub hoes and trench picks for digging out Ribes. Pulaskis are also useful in digging out clumps of Ribes.

## Method of Work.

Slashing. Clear a place where brush is to be piled. Men doing the slashing should work about 15 feet apart, throwing the cut brush behind them. Care must be taken not to cut off the Ribes.

Piling brush. The manner in which brush is piled will depend upon the conditions on the ground, such as amount of brush, width of stream bottom, season of year, proximity of standing timber, and any other factors influencing the fire hazard. Any instructions received from forest officers regarding the location and size of piles must be followed.

1. Windrows. In wide stream bottoms where brush is heavy and the slashing is done before the middle of August, the brush may be piled in windrows. Pile the brush so that the limbs lie lengthwise with the windrow all pointing in the same direction with butt ends up and the tips of the limbs at the bottom of the pile. Make windrows as large as possible. As much down timber and debris as is on the ground should be put into the piles to insure a clean burn. Never make windrows or brush piles near standing timber or other inflammable material.
2. Individual brush piles. Where brush is light or when slashing is done late in season, use individual piles in order to get sufficient fuel to burn. Space piles properly to avoid unnecessary carrying of brush and to insure a large enough pile to burn. Keep piles in uniform alignment to facilitate reworking. Pile limbs with butts up, all pointing in same direction and with tips down.

Pulling Ribes. The men doing the slashing dig out Ribes with their Pulaskis as they encounter them. Just prior to burning the piles, a systematic working of the slashed area must be done to get as many of the Ribes as possible which were trampled into the ground or partially broken off by the slashing crew.

Burning. Burning is done only under the direction of a forest officer or fire warden when conditions are safe.

Hauck or propane torches are necessary for starting the fires. If burning conditions are difficult, a mixture of crude oil and gasoline applied with pressure sprayer to the brush gives good results.

Fire pumps should be close at hand and a sufficient number of men available to handle an emergency.

If crews placed piles too close to standing timber or where there may be a chance for the fire to get out of control, the piles must be moved to a safer location before burning.

### BULLDOZER METHOD

This method is adapted for use on extensive areas of stream type where heavy concentrations of R. inerme are present. It is impractical to attempt the eradication of Ribes from such areas by hand pulling or slashing methods. A bulldozer machine is used to clear the ground of brush and Ribes and to pile this material in windrows for burning. This method calls for close supervision by specially trained men. Since there are only two bulldozers engaged on this type of work it is not necessary to discuss this method in full.

### DECAPITATION AND CHEMICAL TREATMENT OF RIBES

This is an auxiliary method designed for the eradication of any Ribes bush which cannot be readily pulled by hand exclusive of the treatment of R. petiolare with chemical. It is for special use on large bushes, bushes whose roots are embedded under trees, logs, or in rock crevices. The amount of equipment and chemical to be carried by a crew will be determined by the Ribes conditions on the area being worked.

#### Equipment and chemical

Where use is required on only a few bushes per day.

- Nine-pocket cartridge belt.
- Two-ounce packages of ammonium thiocyanate.
- Pulaski.

Where use is required on many bushes during a day.

- Canvas pouch.
- Specially treated paper bags for ammonium thiocyanate.
- 2-Oz. scoop.
- Pulaski.

#### Method of decapitation and treatment. (see illustration)

A single well placed cut with a Pulaski through the crown tissue of a Ribes bush prepares it for chemical treatment.

Scarify crown by kicking it with a caulked shoe. Next sprinkle over the crown the two-ounce dose of dry chemical. Leave the crown and chemical exposed.



# THE DECAPITATION AND CHEMICAL TREATMENT OF R. VISCOSISSIMUM

TYPICAL PROBLEM BUSHES, METHOD OF TREATMENT AND TYPES OF TOOLS SUGGESTED FOR FIELD USE



W-1467-1 This bush is difficult to pull or dig because of the size and vigor of its root system.



W-1467-2 A single well placed cut with a Pulaski prepares it for chemical treatment.



W-1467-3 Note the clean cut through crown tissue. The crown has also been subjected to additional scarification by kicking it a few times with a caulked shoe.



W-1467-4 Next sprinkle over the exposed crown the dose of dry chemical. If water is available moisten the crown before adding the chemical. (2 oz. of dry powdered Borax was used on this crown.)



W-1467-5 The aerial part of the bush removed by the decapitation treatment.





# THE DECAPITATION AND CHEMICAL TREATMENT OF R. VISCOSISSIMUM

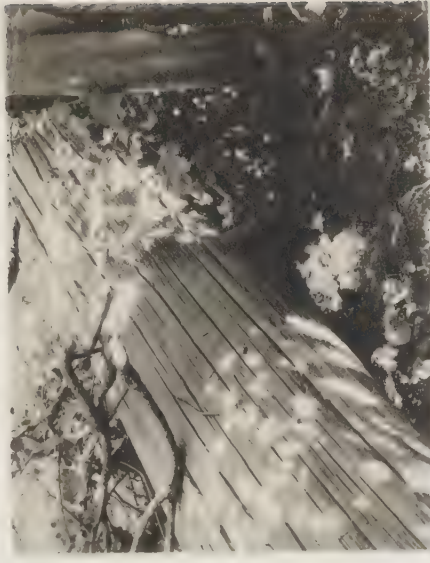
TYPICAL PROBLEM BUSHES, METHOD OF TREATMENT AND TYPES OF TOOLS SUGGESTED FOR FIELD USE



W-1468 *Ribes viscosissimum* growing out from under a down fence. Bushes of this sort run up the costs of hand eradication.



W-1470 Showing the same problem as in W-1468 and a convenient way of cutting off such bushes by means of a pair of long handled pruning shears.



W-1470-1 Bush shown in W-1470 after decapitation by the pruning shears and addition of the chemical.



W-1469 Another problem frequently encountered in the eradication of upland Ribes.



W-1469-1 The clipping types of tools shown in this picture are effective weapons of eradication if followed up by application of dry chemical to the crown of the cut bushes.





Do not cover up with dirt.

### TRAINING

Efficient and economical methods for eradicating Ribes have been developed through experimentation and practical experience. Those methods have been adapted to meet the various forest conditions which affect Ribes growth and distribution. Men can work most advantageously when they are trained to recognize these conditions and to know what to do in all cases. Particular attention must be given in training men and in teaching them the scientific facts and various crew methods which facilitate crew work.

Training schools are held for the supervisory personnel. Training does not end there, but must be carried on in each individual camp. Camp supervisors and foremen must not only continue to develop their own understanding of the entire problem but they must also train their men thoroughly in all phases of the field work. There are certain fundamental points on which the men in the camps must be trained at the start, other features of the work must be brought to their attention throughout the season.

#### HAND ERADICATION. - Preliminary training.

Discussion - One-half hour. White pine blister rust, what it is, how it was introduced into the Northwest, how it spreads, and how it is controlled.

Demonstration. - One-half hour. Show specimens of Ribes found on the area, have men examine them, point out characteristics of each species, tell where various species are most likely to occur.

Demonstration - 15 minutes. Show size of a crew, crew formation, spacing between men, laying of string lines, use of tool, how to pull a bush. Emphasize necessity of getting the root.

Field Practice. Spend rest of day on actual work. Put men in three-man crews with experienced crew leaders behind crew to point out Ribes that are missed. Also have crews go back over their strip to see what bushes they have missed. It is necessary that the camp boss be right out there with these crews showing them various points about the work and answering questions.

#### Training Areas.

Suitable areas, containing as many Ribes species as possible, should be selected on the hillsides for the purpose of training men. After sufficient training, the better crews should be assigned to stream type work. Training areas should be reworked later in the season.

## HAND ERADICATION - Complete training.

Throughout the season each supervisor must educate and train his men by working with them in the field and by holding conferences with them. Important points which should be shown to the men in the field are:

### 1. Eradication types.

Characteristics of each.

Influence of type on Ribes growth.

Effect of shade in suppressing Ribes growth.

Effect of soil and duff disturbances on germination of Ribes seeds.

Effect of fires on germination of Ribes seeds.

Numerous bushes come in after light burns.

Few bushes come in after heavy or second burns.

### 2. Crew methods.

Organization

Width of Strips.

Proper pulling of bushes.

Speed of work.

Efficiency of work.

## CHEMICAL ERADICATION - Training

### Discussion and demonstration - one hour.

Where method is used - effective on R. petiolare.

Hazards connected with the use of Atlacide and regulations to prevent accidents.

Crew organization and laying out of lanes in stream type.

Demonstrate equipment. Show all parts of pump.

Demonstrate how to mix chemical.

Explain filling stations.

Demonstrate how to spray a bush.

Importance of root crown application.

Spraying leaves and stems.

### Field practice.

Organize men into crews and start actual work.

Camp boss must observe work of each man to see that the spraying is done properly.

Additional training. During the course of season a camp boss must check on the way his crews are spraying bushes, in order to prevent waste of chemical by over-treatment and to correct any faults in the method.

## DECAPITATION AND CHEMICAL TREATMENT OF RIBES.

Demonstrate method.



Note: Consider carefully the description of the various eradication methods and continue to train and educate the men to use and follow the instructions which are listed. All blister rust men serving in a supervisory capacity should study the progress of the work. They should study the men working under them. Frequent conferences should be held, especially with the crew leaders in each camp to discuss all features of the work, including crew methods, width of strip, and speed of work under varying forest conditions. Careful study and thorough analysis of field work will reveal ways and means of securing greater output and more efficient work.

The successful supervisors in blister rust work have been those who spent their time with the men in the field, leading them and training them. Supervisors and foremen should read the following carefully and incorporate the qualities of a leader into their work.

1. The boss drives his men; the leader coaches them.
2. The boss depends upon authority; the leader on good will.
3. The boss inspires fear; the leader inspires enthusiasm.
4. The boss says, "I"; the leader, "we".
5. The boss assigns the tasks; the leader sets the pace.
6. The boss says, "Get there on time"; the leader gets there ahead of time.
7. The boss fixes the blame for the breakdown; the leader fixes the breakdown.
8. The boss knows how it is done; the leader shows how.
9. The boss makes work a drudgery; the leader makes it a game.
10. The boss says, "Go"; the leader says, "Let's go".
11. The boss is antagonistic; the leader is diplomatic.

### STANDARDS OF EFFICIENCY

#### Relation of Eradication Costs to Eradication Efficiency.

The ultimate goal of Ribes eradication is the complete extermination of all Ribes within the control areas. In approaching this desirable condition, there are many lines of attack. The plan which must be followed is that which will give a high degree of efficiency. It is highly important, however, that there be a proper balance between the per-acre costs of Ribes eradication, especially in the case of initial working of an area, with the results accomplished. Results are chiefly measured by the permanency of the Ribes-free condition set up on an area and the degree to which the job of Ribes eradication will protect the pine on that area over an extended period. If the Ribes-free condition established in one year will not continue over a long period and the area will be restocked with Ribes by natural means, no permanent protection has been secured. It is on such areas that it is possible to spend a great amount of time and money merely to temporarily reduce the Ribes population only to be faced with another eradication job in the course of three or four years. Under such conditions, it must be recognized that working methods which involve careful searching over every foot of ground to secure not only the large bushes but also the small seedlings, would involve in many cases a high per-acre cost, far out of line with the results accomplished.

To anyone engaged in Ribes eradication work in the white pine type, it must be apparent that different areas represent different stages in the development of the Ribes flora. These stages may be classified in three broad groups:

1. Ribes population on the increase.

On certain areas where the duff has been disturbed by logging or partially destroyed by fire within the recent past, there are frequently found not only the larger and more mature Ribes bushes, but numerous seedlings and very young plants, varying in size and age from those a year or two old and a foot or two in height to the tiniest seedlings. A careful examination of such an area will reveal the fact that the Ribes population is still increasing. A most painstaking and costly job upon this area might result in the removal of every Ribes bush down to the smallest seedling, but it is known that within the next year or so more seedlings will appear. It is also known from technical studies and from numerous observations that there will be a very heavy natural mortality among the young bushes now less than one foot in height and that if the ground is searched with sufficient care to eradicate them all, expense would be incurred to remove many bushes which would die by natural means in the near future. These conditions are most generally found in Open Reproduction, Cut Over, Brush and Burn eradication types.

2. Ribes population at full maturity.

A second type of area which can be readily recognized by observation is one upon which a large Ribes population has reached full maturity but where, due to increasing shade and competition from the timber stand, no new seedlings are appearing. It can be readily noted in the field that Ribes bushes which are growing in the shade and under conditions of heavy competition from the forest stand do not form flowers and fruit. The mature bushes upon such an area, however, will still be in a flourishing condition as evidenced by their good annual growth and full foliage. Upon such an area we have no seedlings with which to cope in eradication. When a thoroughly efficient job of removing the large bushes is done upon such an area, the Ribes-free condition thus set up will continue over a long period. These conditions are common in Open Pole and Open Mature eradication types.

3. Ribes population on the decline.

A third type of area which can be recognized in the field is one in which the Ribes population has been subjected to such severe competition by the forest cover and for such an extended period that the Ribes population is obviously on the decline. This condition is typified by the presence of old large bushes bearing long stems, but generally with only a few leaves near the tips of these stems. Here again there is no major Ribes seedling problem and one can feel assured that a good job of Ribes eradication will protect the area from blister rust for an extended period. This condition is common in Dense Pole and Dense Mature eradication types.

Ribes Live Stem per Acre Standard

In order to achieve the objectives of efficiency at a reasonable cost, the facts noted above must be taken into account. In order to protect the pine



from blister rust, we must set up a high standard of efficiency and rigidly adhere to it. This standard has been set at 25 feet of live stem per acre. Areas which crews have worked and which are found by the checkers to still contain more than 25 feet of Ribes live stem per acre, must be reworked. The only variation from this rigid rule which can be recognized will be on those areas representing the first classification discussed above, and which contain numerous Ribes seedlings. On such areas it will be the purpose of the field method used to secure the eradication of all large bushes and of as many of the seedlings less than one foot in height as is compatible with a reasonable cost per acre. This standard should be interpreted to mean that crewmen will be expected to pull all of the large bushes and as many of those under one foot in height as they can find and pull without by so doing increasing unduly the cost per acre. This rule means, however, that the crewmen are not to be instructed to painstakingly cover every foot of ground in an effort to find and remove the last seedlings.

This standard of 25 feet of live stem must be interpreted in relation to the cost of working areas. It represents the maximum number of feet allowable per acre. When more efficient work can be done at a low and reasonable cost, it should be done. The following policy should govern the relation of costs and efficiency of work. The working conditions in the various eradication types determine the proper eradication method to use, the spacing between men in the crews, and the pace at which the men can work in order to find and pull Ribes one foot or over in size. The factors determining these points have been covered in the manual. A crew employing the proper method of work and diligently concentrating on the task of finding and eradicating Ribes will perform a job in which the efficiency and costs are compatible. There will be cases in which more than 25 feet of live stem are missed and these areas must be reworked. However, if less than 25 feet were left, the area should not be reworked to obtain a higher efficiency.

In the course of their work, the checkers will record all Ribes of all sizes found upon the ground following eradication. The efficiency of the crews, however, will be determined upon the basis of Ribes live stem contained only in bushes of one foot or more in size. Areas which contain more than 25 feet of live stem in the form of bushes one foot or over in size, will have to be reworked; those containing less than 25 feet of live stem on this basis will be considered as satisfactory. The information secured by the checkers regarding the number of bushes under one foot in size upon the area will merely be used to assist in determining the time at which the area will have to be reworked.

This 25 feet of live stem per acre will not be based on averages over large areas, but will be based on blocks of area as small as 20 or 40 acres. This procedure is necessary to avoid leaving patches of Ribes over the area. Eradication supervisors must study the checking maps closely to avoid leaving such patches.

#### Coordination of eradication and checking work.

It is necessary that the camp boss organize the work of his crews to make areas available for checking as soon as possible. This means that worked

area must be kept in a contiguous solid block and that necessary rework be done immediately after the lapse of 3 or 4 days following the crew work. Areas which have been worked by crews must be turned over to the checker as soon as possible and any undue delay in this matter will be open for investigation.

The checking of Ribes eradication work is an important phase in the control program. The checking organization endeavors to assist the eradication forces in any way possible. Its chief function, however, is checking worked area and this work will take precedence over any other work.

A high degree of cooperation is expected between the eradication and checking forces to facilitate both lines of work and to obtain a satisfactory job of Ribes eradication.

### DEFINITION OF TERMS AND OTHER INFORMATION

First working. This represents the first season's work on an area. All Ribes eradication work done on an area in a single season constitutes a single working. Regardless of the number of times the area is covered during the season to meet the standard of efficiency, this work represents one working in the reports.

Second working. This represents the second season's work on an area one or more years after the First Working.

Third working. This represents the third season's work on an area one or more years after the Second Working.

Rework. When areas are worked more than once during the same season, this additional work is called "Rework". The first time over the ground and all the additional rework during the same season constitute one "Working".

Land units and measurements.

Townships. A standard township is a territory six miles square containing 36 sections.

Sections. A standard section is one mile square containing 640 acres.

Acre. 43,560 sq. ft.

Chain.

1 chain equals 66 feet.

5 chains equal 1 tally.

80 chains equal 1 mile.

10 square chains equal 1 acre.

Formulae for making calculations.

$$\frac{\text{Total Number Ribes}}{\text{Number of Acres}} = \text{Ribes per Acre.}$$

$$\frac{\text{Total Number Man Days}}{\text{Number of Acres}} = \text{Man Days per Acre.}$$



## REPORTS AND FORMS

(see samples)

### Eradication Forms

Daily crew reports. The following forms are for use by crew leaders in reporting daily work to foreman or camp boss.

- #101 Hand Eradication Daily Crew Report
- #102 Chemical Eradication Daily Crew Report
- #103 Slash and Burn Daily Crew Report

Progress records. Data from the daily crew reports must be summarized and transferred daily to the following forms:

- #111 Hand Eradication Daily Progress Record by Eradication Types
- #112 Chemical Eradication Daily Progress Record
- #113 Slashing and Burning Daily Progress Record

Progress reports. These forms are used for summarizing all eradication data from forms #111, #112, and #113. These forms are used for making monthly reports.

- #115 Progress Summary for Ribes Eradication (For use by camps)
- #116 Monthly Progress Report (For use by operation supervisors reporting data to Spokane Office.)

### Special records in ECW camps.

- #120 Daily Man Day Distribution Record. Daily record of activities of each enrollee according to symbols found on form #121.
- #121 Monthly Man-Day Analysis. Compilation of data recorded on form #120.
- #122 ECW Weekly Man-Day Report. Compilation of data recorded on form #121.

### Personnel rating.

No. 17. Field Personnel Record.

This record must be filled out for every person on the job, aside from Army personnel and men entirely on Army detail in ECW camps. Fill in items one to seven inclusive as soon as a man reports for duty. When a man leaves, complete the record and have it approved by the unit supervisor.

### Time records.

Each camp boss in charge of a regular 30- or 60-man camp will be furnished with samples of time records which he must keep, and will be instructed in their preparation and disposition. Likewise each camp boss will be instructed on the hours of work. They may vary with different operations.

Instructions will be given as to distribution of work by cooks and flunkies.

Work weeks will begin on Monday so that time lost during the week due to rain can be wholly or partially made up on Saturday and Sunday.

ECW camp superintendents will be instructed as to what time records are necessary, how to keep them and what disposition to make of them.

### ERADICATION MAPS

#### Permanent Record Map - Upland Types.

See sample for form, scale, and legend.

This map is to be turned in at the close of the season with all data recorded on it as specified on the sample map. In all cases the camp boundary must be drawn in as the correct boundary for measuring acres. Particular attention must be given this point when working unit boundaries, roads, etc. are located in the same place as the camp boundary.

This map is made up gradually to show progress as the area is worked.\*

Show worked area by broken lines using the standard color legend.

Color area in solid after it has been checked and conforms with the standard of efficiency. Do not color unworked area.

Send tracing of completed area with monthly progress report.

#### Permanent Record Map - Stream Type.

See sample for form, scale, and legend.

This map is of particular use on projects where chemical eradication work is done, and may be used on other projects at the discretion of the operation supervisor.

This map is to be turned in at the close of the season with all data recorded on it as specified on the sample map. Camp boundaries must be drawn in as the correct boundary for measuring acres.

#### Advance Survey Map.

See sample of map in Checking Manual.

Checkers will assist in making this advance survey map.

This map is used for planning the work and can be used as a base map for the Permanent Record Map.

This map should be turned in with the Permanent Record Map.

#### \*Progress Map - Upland Types.

It may be necessary to keep a rough progress map identical with the Permanent Record Map. This will be kept up currently to show progress and the Permanent Record Map can be traced from this map.



# PERMANENT RECORD MAP — UPLAND TYPES

R. 5 W. R. 4 W.

## LEGEND

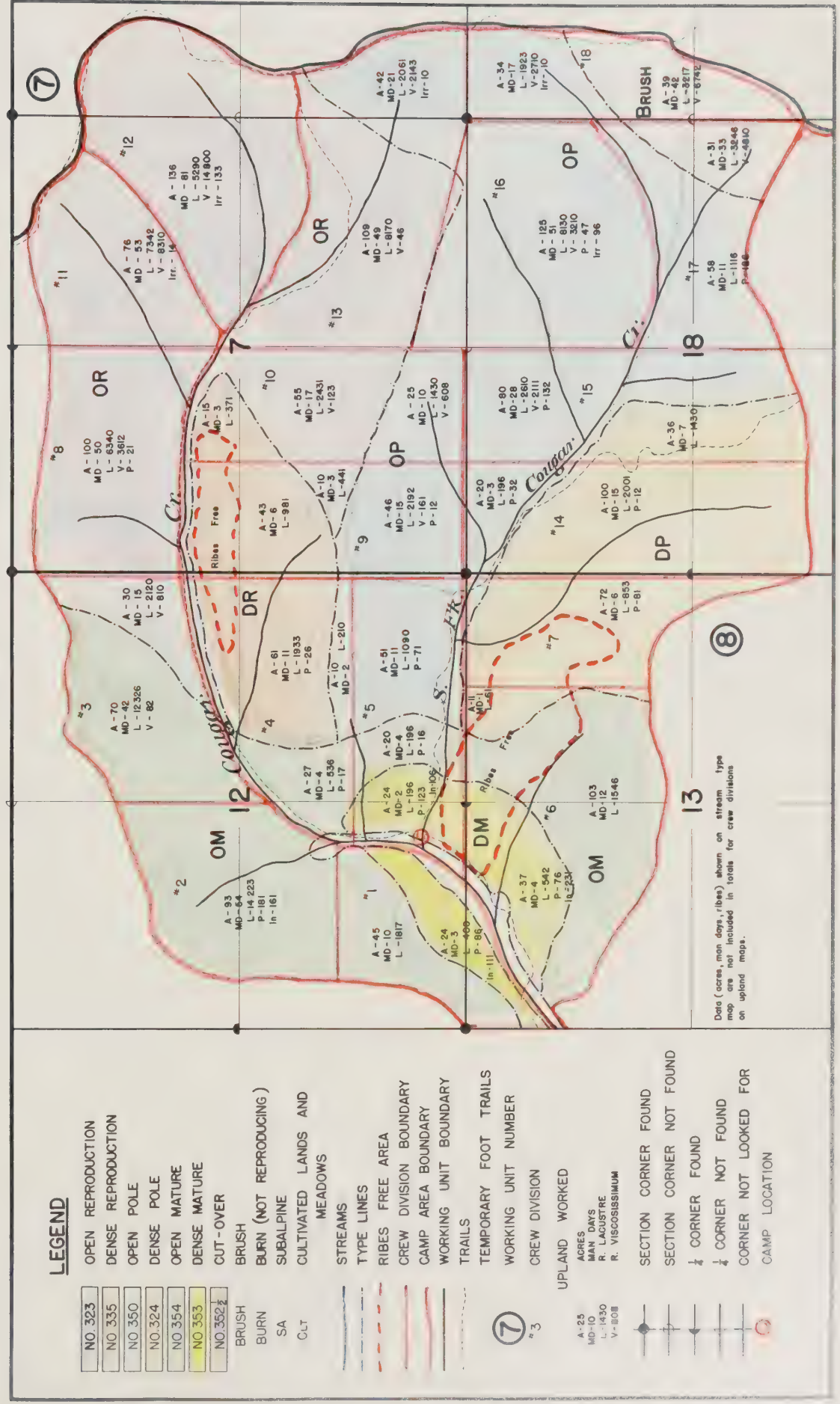
NO. 323	OPEN REPRODUCTION
NO. 335	DENSE REPRODUCTION
NO. 350	OPEN POLE
NO. 324	DENSE POLE
NO. 354	OPEN MATURE
NO. 353	DENSE MATURE
NO. 352 1/2	CUT - OVER

BRUSH  
BURN  
SA  
CLT  
SUBALPINE  
CULTIVATED LANDS AND MEADOWS

STREAMS  
TYPE LINES  
RIBS FREE AREA  
CREW DIVISION BOUNDARY  
CAMP AREA BOUNDARY  
WORKING UNIT BOUNDARY  
TRAILS  
TEMPORARY FOOT TRAILS  
WORKING UNIT NUMBER  
CREW DIVISION  
CREW WORKED

UPLAND WORKED  
MAN DAYS  
R. LACUSTRE  
R. VISCOSISSIMUM

SECTION CORNER FOUND  
SECTION CORNER NOT FOUND  
CORNER FOUND  
CORNER NOT FOUND  
CORNER NOT LOOKED FOR  
CAMP LOCATION



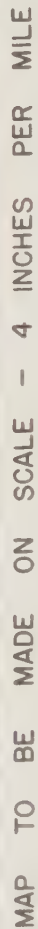
Data (acres, man days, /lbs) shown on stream type map are not included in totals for crew divisions on upland maps.

MAP TO BE MADE ON SCALE - 4 INCHES PER MILE

T. 46 N.











# DAILY CREW REPORTS

Samples

101. Hand Eradication - Daily Crew Report  
Date 7/3/35 Crew Ldr. John Doe Crew Div. 3

Type	Acres	Man Hours	Ribes Pulled			Total
			lac.	vis.		
OR	2.4	13	210	340		550
OM	8.5	5	160			160
Tot.	10.9	24	370	340		710

102. Chemical Eradication - Daily Crew Report  
Date 6/24/35 Crew Ldr. John Doe Stream No. 2

Acres	Man Hours	Gallons
2.6	48	310

103. Slash and Burn - Daily Crew Report  
Date 6/3/35 Crew Ldr. John Doe Stream No. 2

Slashing		Burning	Total
Acres	Man Hours	Man Hours	Man Hours
1.4	80	32	112





Crew Div. No. 3

Camp No. 21 Working Unit No. 14

Type Open Mature

Foreman      John Doe

Month & Year July, 1935

[illegible]

1. One crew division and one eradication type on a form.
2. Total acres for each type must be obtained from permanent record map.
3. For monthly progress reports, estimate acres worked on unfinished crew divisions as closely as possible. When crew division is completed adjust acres worked so that the total acres worked corresponds exactly with the number of acres shown on the map.





WF-BRC-#112-4/15/35

CHEMICAL ERADICATION  
DAILY PROGRESS RECORD

Camp No. 21June, July and  
Months & Year August, 1935Foreman John DoeWorking Unit No. 14

Date	Acres	Man Hours	Gallons	Stream No.	Pounds Per Gallon
6/24/35	2.6	48	310	2	1 #
25	3.0	48	305	2	1 #
26	2.5	48	320	2	1 #
27	1.6	40	250	2	1 #
28	2.0	40	260	2	1 #
29	2.5	48	290	2	1 #
June Total	14.2	272	1,735		
7/1/35	3.0	48	320	2	1 #
2	2.5	48	310	2	1 #
3	3.1	48	300	2	1 #
5	3.5	48	290	2	1 #
July Total	12.1	192	1,220		
8/12/35	Respray	16	48	2	1 #
13	"	16	60	2	1 #
14	"	16	40	2	1 #
15	"	16	30	2	
August Total	-	64	178		
Total	26.3	528	3,133		
Total Man Days		66	Divide total Man Hours by 8. Use nearest whole number.		





WF-PRC-113-4/15/35

SLASHING AND BURNING  
DAILY PROGRESS RECORD

Camp No. 21

Working Unit No. 14

Stream No. 2

Foreman \_\_\_\_\_

Months & Year June-Sept., 1935

Date	Slashing		Burning	Total
	Acres	Man Hours	Man Hours	Man Hours
6/3/35	1.4	80	-	80
6/4/35	1.1	80	-	80
6/5/35	2.5	184	-	184
6/6/35	1.6	184	32	216
6/7/35	2.4	184	32	216
June total	9.0	712	64	776
7/9/35	-	-	104	104
7/10/35	-	-	104	104
7/11/35	-	-	16	16
Sept. total			224	224
Total	9.0	712	288	1,000
Total Man Days (divide total man hours by 8)				125





WF-PBC - 115 - 6/15/35

Camp No. 52

Working Unit No. 7

Forest St. Joe

## PROCESS SUMMARY FOR RIBES ERADICATION

Working First

1st, 2nd, 3rd, etc.

Period: from July 1 to July 31

Eradication Type	Acres	Eff. Man Days	Number of Ribes Pulled						Gals. Spray	Per Acre Basis	
			R. Lac.	R. Visc.	R. Pet.	R. Iner.	R. Irr.	Tot. Ribes		M.D.	Ribes Gals.
O. Rep.	234	145	21,736	13,052			171	34,950		.62	149
D. Rep.											
O. Pole	245	110	15,260	6,110				25,370		.45	104
D. Pole	257	30	2,570		261			2,831		.14	11
O. Mature	305	63	7,201	464				7,665		.17	21
D. Mature											
Cut-Over											
Brush	38	40	2,452	5,881				9,533		1.05	251
Burn											
Alpine											
ALL PLANT	1,139	393	54,410	25,507	261		171	80,358		.35	71
Str. (Hand)	26	11	2,448		73	2,107		4,628		.42	178
Str. (Chem.)	38	91							3,640	2.40	96
Str. (Slash)	3	35								11.67	
ALL STREAM	29	137	2,448		73	2,107		4,628			
ALL TYPES	1,168	530	56,857	25,507	334	2,107	171	84,986			

1. Use separate sheet for each working unit.

2. Use separate sheet for first, second, or third working. The number of workings refers to number of times areas were worked in different years. All work done on same piece of ground during one season constitutes a single working.

3. Do Not include Str. (Chem) acres in ALL STREAM or ALL TYPES totals.

4. All data on this form must agree with data on Permanent Record Map.





## FIELD PERSONNEL RECORD

UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE  
BLISTER RUST CONTROL  
618 REALTY BUILDING, SPOKANE, WASH.

1. Name \_\_\_\_\_ Phone \_\_\_\_\_  
(Print) (Last) (First) (Middle)

Street \_\_\_\_\_ City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_

2. Height \_\_\_\_\_ Weight \_\_\_\_\_ Health \_\_\_\_\_ Where born \_\_\_\_\_  
(City) (State)

Date of birth \_\_\_\_\_ Single \_\_\_\_\_ Married \_\_\_\_\_ Widowed \_\_\_\_\_  
(Month) (Day) (Year)

Number of dependents \_\_\_\_\_

3. War Veteran \_\_\_\_\_ Service \_\_\_\_\_  
(Organization—Navy, Army, etc.) (Period)

4. Education: Grammar \_\_\_\_\_ High School \_\_\_\_\_ College \_\_\_\_\_  
(Years completed) (Years completed) (Course) (Degree)

Special training: \_\_\_\_\_

5. Principal employment other than Blister Rust Control \_\_\_\_\_

EMPLOYER (Name of company preferred)	ADDRESS OF EMPLOYER	PERIOD EMPLOYED	POSITION	PAY RATE (Average)

6. Type of job held this year \_\_\_\_\_ Rate of pay \_\_\_\_\_ Project \_\_\_\_\_  
(Fund or appropriation)

Forest \_\_\_\_\_ Camp No. \_\_\_\_\_

Services started \_\_\_\_\_ Services ended \_\_\_\_\_  
(Month) (Day) (Year) (Month) (Day) (Year)

7. Rating on job held this year: (underline) Above average, average, below average, unsatisfactory, discharged.

If unsatisfactory or discharged, state reasons in full \_\_\_\_\_

8. Rate man on the following points: (Above average; Average; Below average).

Industry \_\_\_\_\_ Personality \_\_\_\_\_ Reliability \_\_\_\_\_

Cooperativeness \_\_\_\_\_ Organization and planning of work \_\_\_\_\_

Ability to organize and handle men \_\_\_\_\_ Accuracy of records \_\_\_\_\_

9. Is reemployment recommended? \_\_\_\_\_

As unit supervisor \_\_\_\_\_ Camp superintendent \_\_\_\_\_ Camp boss \_\_\_\_\_ Foreman \_\_\_\_\_

Crew leader \_\_\_\_\_ Laborer \_\_\_\_\_ Checker foreman \_\_\_\_\_ Checker \_\_\_\_\_

Cook (first or second) \_\_\_\_\_ Flunky \_\_\_\_\_ Special \_\_\_\_\_  
(State job)

10. Remarks:

Reporting officer \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Approving officer \_\_\_\_\_ Title \_\_\_\_\_





E. C W  
DAILY MAN PAY DISTRIBUTION RECORD

Project KaniksuPeriod May 1 to May 31[illegible]





Classification	Symbol	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average
Ribes																																		
Eradication	E			161	161	150	161																											
Road																																		
Construction	V			14	14	18	14																											
Road																																		
Maintenance	M			2	2	6	-																											
Fire																																		
Suppression	F																																	
F. S.																																		
Wood Detail	W			-	2	2	2																											
F.S. Clerk &																																		
Truck Drivers	D			4	4	4	4																											
Camp																																		
Construction	C																																	
Army Camp																																		
Detail	A	26	26	26	26	26	26																											
A. W. O. L.	O	2	2	2	2	-	-																											
Sick	S	1	-	2	-	1	-																											
On Leave	L																																	
Detached																																		
Service	X																																	
Rain, Sundays & Holidays	R	180	181																															
Total		209	209	209	209	207	207																											

The information recorded on form #106 must be summarized and posted on this form daily.





WF-BRC-#122-4/15/35

E. C. W.  
WEEKLY  
MAN DAY REPORT

Project St. Joe

Period June 2 - 8, 1935

Camp Number	Company Average Enrolled Strength	Number Men Turned Over to Camp Superintendent		Effective Percent	Effective Percent Previous Period
		Total	Average Per Working Day		
F-103	199	875	175	88	83
F-161	187	820	164	88	89
F-101	200	800	160	80	80
Total or Average					

The "Effective Percent" is determined by dividing the average number of men turned over to the superintendent per working day by the company average enrolled strength.





## Parts for Blister Rust Control Knapsack Sprayer

### Parts for Utility No. 80 Service Nozzle:



No. 80 Angle Service Nozzle



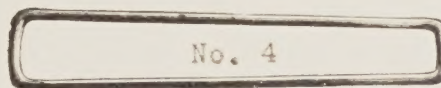
Inside Parts of Nozzle

- N 118 - Brass nozzle cap
- N 111 - Brass spray disc
- N 114 - Leather nozzle gasket
- N 126 - Brass whirl disc
- N 124 - Brass nozzle strainer

### Brown's Siren Pump:



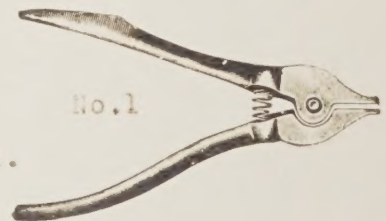
- 336 Leather washer for nozzle connection
- 500 Brass packing ring for plunger
- 505 Graphite packing for plunger
- 507 Brass support for leather cup
- 509 3/8" brass ball for air chamber and plunger valves
- 511 Leather cup for plunger
- 512 Valve seat for plunger
- 516 Valve seat for air chamber
- 517 Three hole ball stop
- 522 30" 5 ply high pressure hose (any additional length may be furnished)
- 523 Hose clamp
- 524 Packing gland for connecting air chamber to plunger
- 528 Grease cup
- 548 Felt washer for grease cup
- 549-1 Air chamber assembled complete
- 551-1 Pump cylinder assembled complete



4 Caldwell Hose Strap- 3 3/4 inch.

⊗ Spring support for brass ball.

○ Washer for three hole ball stop.



1 Caldwell pliers.

### Nozzle Extension:

Made from 2 feet, 1/8 inch black pipe threaded  
One 1/4 x 1/8 reducer and one 1/4 x 1/8 bushing

